

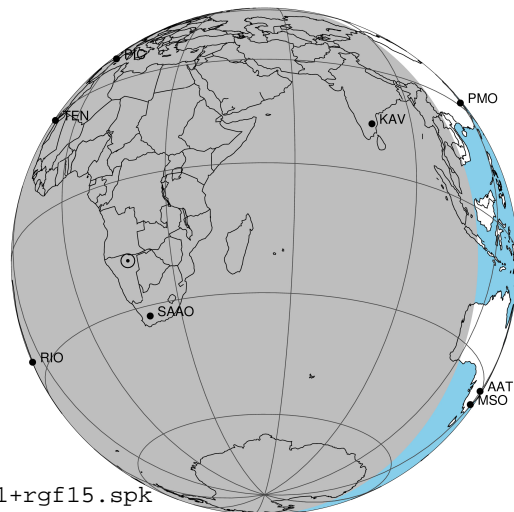
target : Jupiter
 target radius (km) : 71492.00
 C/A epoch : 2031-05-15T22:43:05.390
 Event type : Pgt
 : Jupiter occs: geocentric, topocentric
 : Not a ringed target
 Gaia source ID : 4068932891020578688
 2Mass ID (if available) : 17473399-2253302

Jupiter 2031-05-15T22:43:05 K7.35 G14.54 Pgt

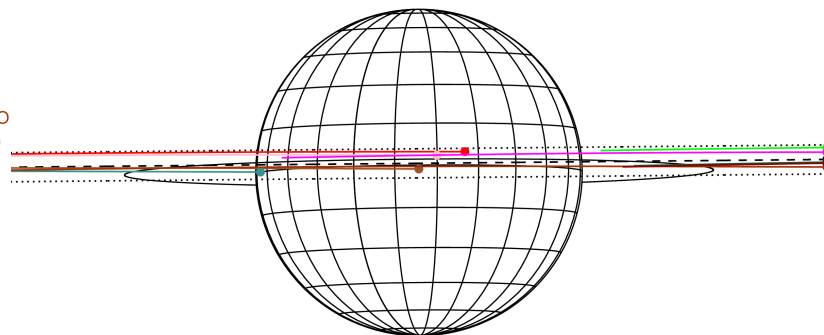
ICRS Star Coord at Epoch: 17h 47m 33.98591s -22:53:30.48412s

RUWE (>1.4 is poor) : 0.91
 K magnitude : 7.346
 G magnitude : 14.543
 RP magnitude : 12.873
 BP magnitude : 18.598
 DUPflag : 0
 Distance (au) : 4.412
 f0 (km) : 0.00
 g0 (km) : 0.00
 skyplane vel. (km/s) : -11.78
 Sun-Target sep (deg) : 147.33
 Sun-Moon sep (deg) : 84.53
 B (ring opening deg) : -2.61
 PA of pole (deg) : 0.50
 Pole direction: RA (deg): 268.05694
 Dec (deg): 64.49651
 C/A sky separation (") : 1.257
 C/A sky separation (km) : 4022.8
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk

Jupiter 2031-05-15T22:43:05 K7.35 G14.54
 Pgt



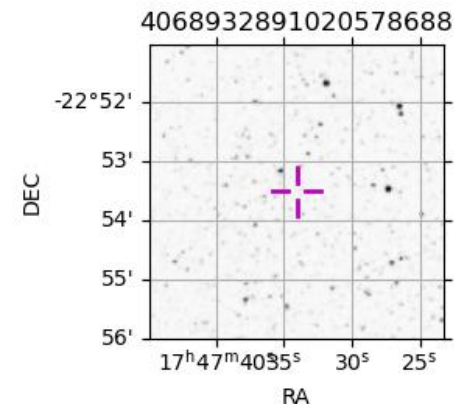
Earth
 PIC
 PMO
 TEN
 KAV
 RIO
 ESO
 AAT
 SAAO
 MSO



2031-05-15T22:43:05.3900 at: 17 47 33.9859 s: -22 53 30.484 C/A 1.245" PA 180.55 deg v_sky -11.78 km/s D 04.41 AU
 Credit: Styled after SORA/Lucky Star

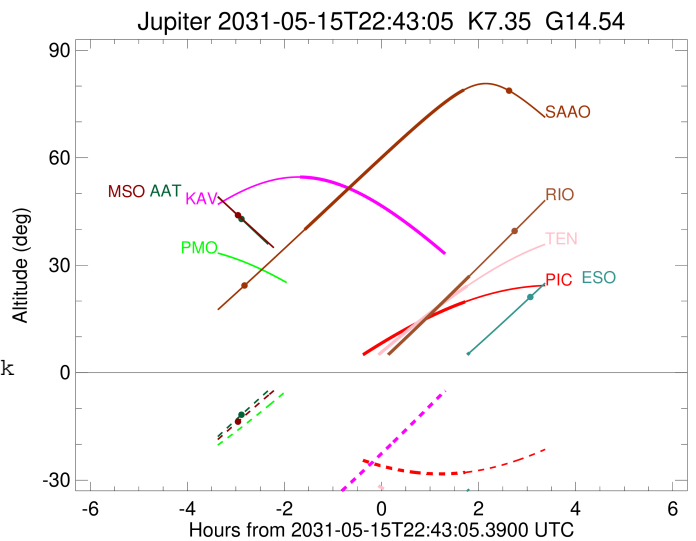
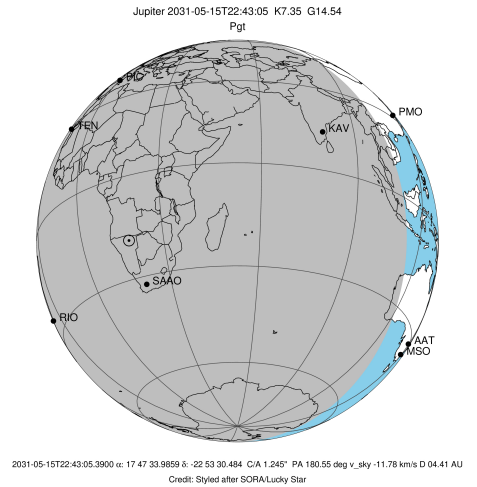
Observable events with sun below -5 deg and altitude above 5 deg

Obs	Location	lat	Elon	Target	Observed Events Interval	OCode
PIC	Pic du Midi	42.9	0.1	+	MAY 16 00:26 - MAY 16 00:26	Pne
PAL	Palomar Mt (200")	33.4	243.1			Pnn
PMO	Purple Mtn Obs. Nanking	32.1	118.8			Pnn
KPNO	Kitt Peak Natl Obs	32.0	248.4			Pnn
MCD	McDonald Obs. 2.7m	30.7	256.0			Pnn
TEN	Teide Obs./Tenerife	28.3	343.5	+	MAY 16 00:28 - MAY 16 00:28	Pne
IRTF	Mauna Kea/IRTF	19.8	204.5			Pnn
KAV	Kavalur Observatory	12.6	78.8	+	MAY 15 21:02 - MAY 15 21:02	Pin
RIO	Rio de Janeiro	-22.9	316.8	+	MAY 16 00:31 - MAY 16 00:31	Pne
ESO	European Southern Obs. (3.6m)	-29.3	289.3	+	MAY 16 00:31 - MAY 16 00:31	Pne
AAT	Siding Spring (AAT)	-31.3	149.1			Pnn
SAAO	So. Afr. Astro. Obs. (Sutherland)	-32.4	20.8	+	MAY 15 21:08 - MAY 16 00:24	Pie
MSO	Mt. Stromlo Observatory	-35.3	149.0			Pnn



```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-15T22:48:13.020
Event type          : Pgt
                    : Jupiter occs: geocentric, topocentric
                    : Not a ringed target
Observer code       : PIC
Location           : Pic du Midi
Latitude (deg)     : 42.93656
E. Longitude (deg) : 0.14231
Altitude (km)     : 2.890
Gaia source ID     : 4068932891020578688
2Mass ID (if available) : 17473399-2253302
ICRS Star Coord at Epoch: 17h 47m 33.98591s -22:53:30.48413s
RUWE (>1.4 is poor) : 0.91
K magnitude        : 7.346
G magnitude        : 14.543
RP magnitude       : 12.873
BP magnitude       : 18.598
DUPflag           : 0
Distance (au)     : 4.411
f0 (km)           : 0.00
g0 (km)           : 0.00
skyplane vel. (km/s) : -11.78
Sun-Target sep (deg) : 147.33
Sun-Moon sep (deg) : 84.71
B (ring opening deg) : -2.61
PA of pole (deg)  : 0.50
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 2.848
C/A sky separation (km) : 9112.3
NAIF SPICE kernels : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
```

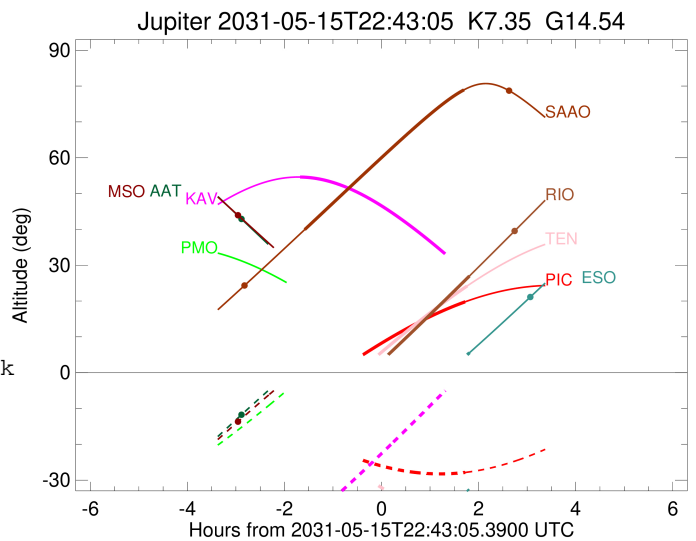
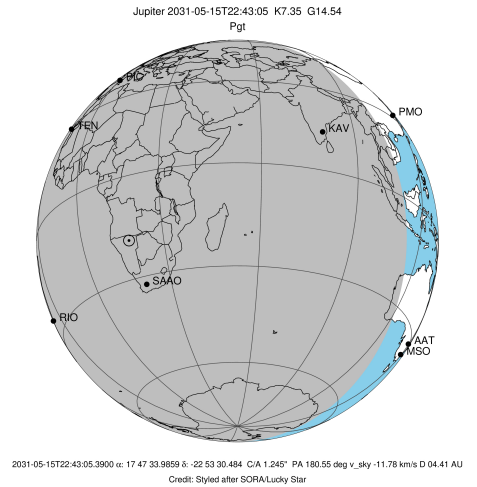


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-15T21:09:01.767	-6.14x	-17.33	71491.9	6.78	7.75
Jupiter	E	2031-05-16T00:26:19.231	19.76	-27.85	71491.8	7.68	8.76

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-15T22:50:21.240
Event type            : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code         : TEN
Location              : Teide Obs./Tenerife
Latitude (deg)       : 28.30050
E. Longitude (deg)   : 343.48909
Altitude (km)        : 2.395
Gaia source ID       : 4068932891020578688
2Mass ID (if available) : 17473399-2253302
ICRS Star Coord at Epoch: 17h 47m 33.98591s -22:53:30.48413s
RUWE (>1.4 is poor) : 0.91
K magnitude           : 7.346
G magnitude           : 14.543
RP magnitude          : 12.873
BP magnitude          : 18.598
DUPflag              : 0
Distance (au)        : 4.411
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -11.78
Sun-Target sep (deg) : 147.33
Sun-Moon sep (deg)   : 84.69
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.50
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 2.371
C/A sky separation (km) : 7587.0
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
```

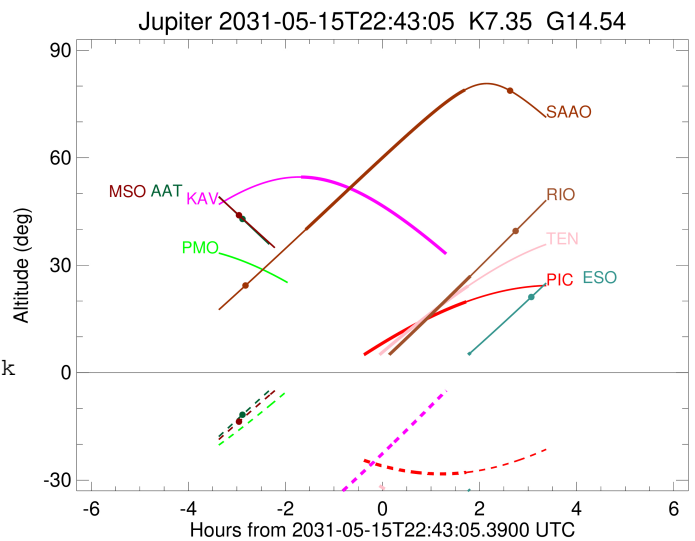
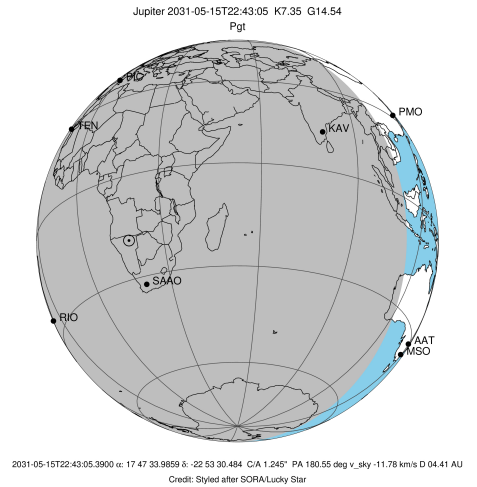


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-15T21:10:15.578	-12.98x	-16.76	71491.9	5.37	6.14
Jupiter	E	2031-05-16T00:28:56.844	24.20	-42.17	71491.9	6.67	7.61

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-15T22:39:29.200
Event type            : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code         : KAV
Location              : Kavalur Observatory
Latitude (deg)       : 12.57556
E. Longitude (deg)   : 78.83167
Altitude (km)        : 0.722
Gaia source ID       : 4068932891020578688
2Mass ID (if available) : 17473399-2253302
ICRS Star Coord at Epoch: 17h 47m 33.98591s -22:53:30.48412s
RUWE (>1.4 is poor) : 0.91
K magnitude           : 7.346
G magnitude           : 14.543
RP magnitude         : 12.873
BP magnitude         : 18.598
DUPflag              : 0
Distance (au)        : 4.412
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -11.78
Sun-Target sep (deg) : 147.33
Sun-Moon sep (deg)   : 85.18
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.50
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 2.347
C/A sky separation (km) : 7509.6
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
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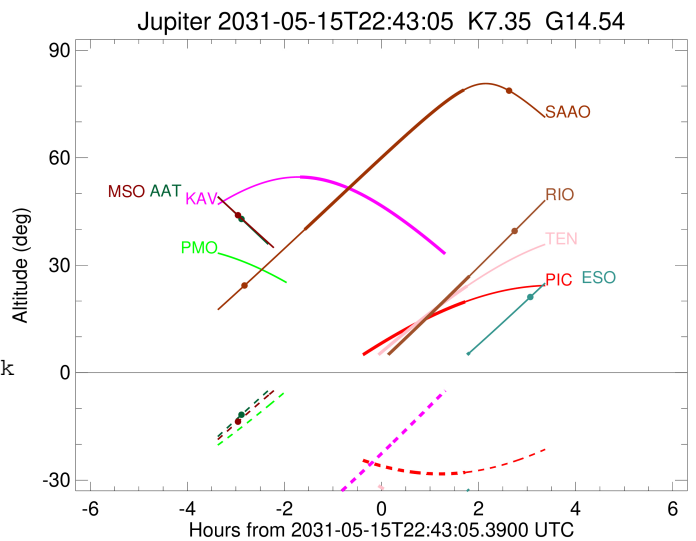
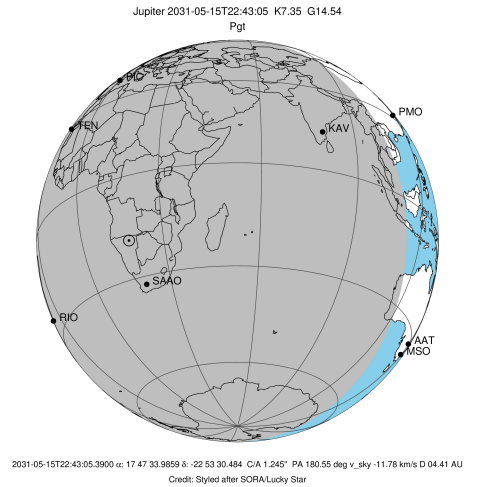


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-15T21:02:23.558	54.60	-43.07	71491.9	6.23	7.12
Jupiter	E	2031-05-16T00:17:03.831	30.18	-1.49x	71491.9	5.49	6.27

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-15T22:51:19.960
Event type           : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code        : RIO
Location             : Rio de Janeiro
Latitude (deg)       : -22.89506
E. Longitude (deg)   : 316.77708
Altitude (km)        : 0.033
Gaia source ID       : 4068932891020578688
2Mass ID (if available) : 17473399-2253302
ICRS Star Coord at Epoch: 17h 47m 33.98591s -22:53:30.48413s
RUWE (>1.4 is poor) : 0.91
K magnitude           : 7.346
G magnitude           : 14.543
RP magnitude         : 12.873
BP magnitude         : 18.598
DUPflag              : 0
Distance (au)        : 4.411
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -11.78
Sun-Target sep (deg) : 147.33
Sun-Moon sep (deg)   : 84.66
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.50
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation ("): 0.483
C/A sky separation (km): 1544.2
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
```

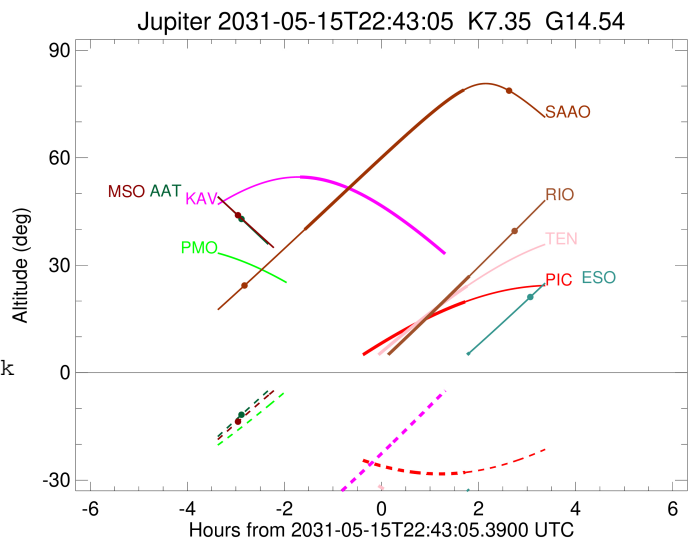
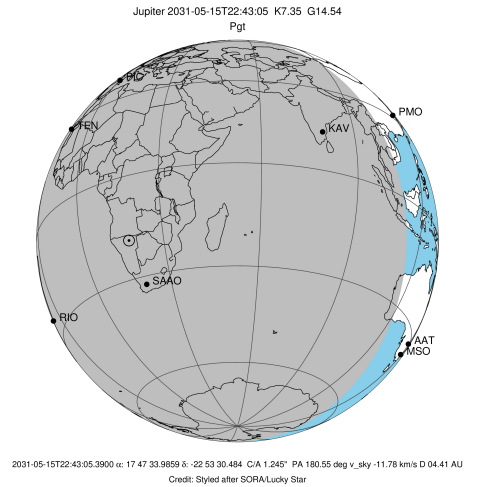


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-15T21:09:01.980	-15.87x	-11.59	71492.0	0.51	0.58
Jupiter	E	2031-05-16T00:31:51.507	26.99	-57.76	71492.0	1.98	2.27

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch            : 2031-05-15T22:49:43.540
Event type           : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code        : ESO
Location             : European Southern Obs. (3.6m)
Latitude (deg)       : -29.26097
E. Longitude (deg)   : 289.26831
Altitude (km)        : 2.400
Gaia source ID       : 4068932891020578688
2Mass ID (if available) : 17473399-2253302
ICRS Star Coord at Epoch: 17h 47m 33.98591s -22:53:30.48413s
RUWE (>1.4 is poor) : 0.91
K magnitude           : 7.346
G magnitude           : 14.543
RP magnitude         : 12.873
BP magnitude         : 18.598
DUPflag              : 0
Distance (au)        : 4.411
f0 (km)              : 0.00
g0 (km)              : 0.00
skyplane vel. (km/s) : -11.78
Sun-Target sep (deg) : 147.33
Sun-Moon sep (deg)   : 84.35
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.50
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation ("): 0.006
C/A sky separation (km): 17.7
NAIF SPICE kernels   : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
```

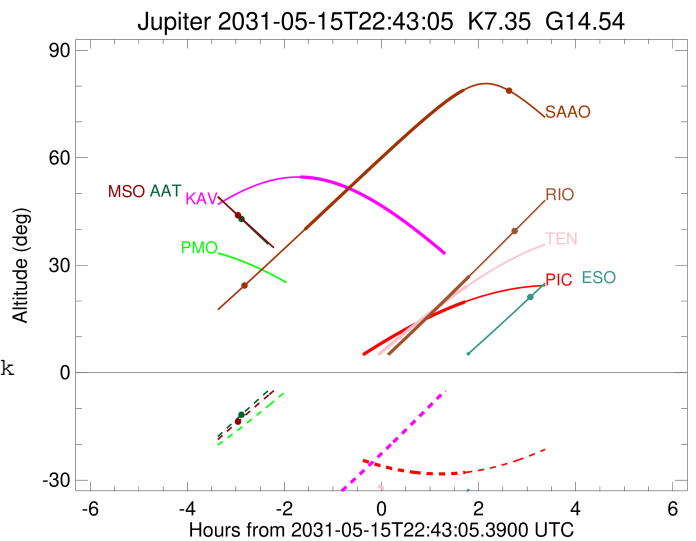
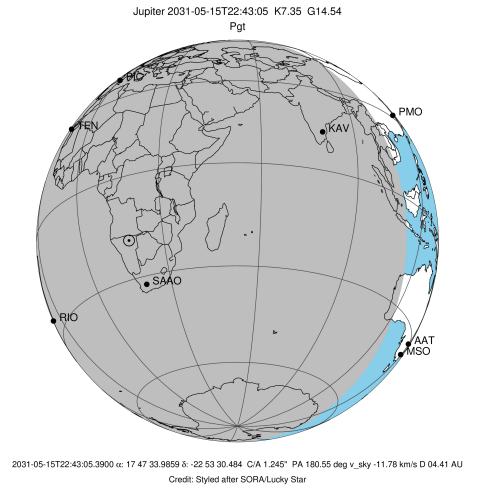


x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-15T21:05:57.734	-29.67x	9.74x	71492.0	-0.51	-0.59
Jupiter	E	2031-05-16T00:31:57.622	5.58	-33.26	71492.0	0.66	0.76

```

target                : Jupiter
target radius (km)   : 71492.00
C/A epoch             : 2031-05-15T22:47:01.280
Event type            : Pgt
: Jupiter occs: geocentric, topocentric
: Not a ringed target
Observer code         : SAAO
Location               : So. Afr. Astro. Obs. (Sutherland)
Latitude (deg)        : -32.37953
E. Longitude (deg)    : 20.81070
Altitude (km)         : 1.768
Gaia source ID        : 4068932891020578688
2Mass ID (if available) : 17473399-2253302
ICRS Star Coord at Epoch: 17h 47m 33.98591s -22:53:30.48412s
RUWE (>1.4 is poor) : 0.91
K magnitude           : 7.346
G magnitude           : 14.543
RP magnitude          : 12.873
BP magnitude          : 18.598
DUPflag               : 0
Distance (au)         : 4.412
f0 (km)               : 0.00
g0 (km)               : 0.00
skyplane vel. (km/s) : -11.78
Sun-Target sep (deg)  : 147.33
Sun-Moon sep (deg)    : 85.39
B (ring opening deg) : -2.61
PA of pole (deg)     : 0.50
Pole direction: RA (deg): 268.05694
Dec (deg): 64.49651
C/A sky separation (") : 0.834
C/A sky separation (km) : 2668.9
NAIF SPICE kernels    : RAJobs_U111+rgf15.spk
URKALLv1.spk
naif0012.tls
nep097.bsp
nep101.bsp
sat4401.bsp
de440.bsp
earth_720101_070426.bpc
jup365.bsp
urall6.bsp
IAU_SATURN_for_RINGFIT.tpc
pck00010.tpc
earth_200101_990628_predict.bpc
uranus_ringframes_rfrench20220627_v1.tf
neptune_ringframes_rfrench20220702a_v1.tf
earth_flat_IAU.spk
    
```



x: target alt < 5.0 deg or sun > -5.0 deg

Target	I/E	UTC	alt	alt-sun	radius	lat-geo	lat-geodetic
Jupiter	I	2031-05-15T21:08:12.458	39.94	-66.80	71492.0	1.67	1.91
Jupiter	E	2031-05-16T00:24:58.770	78.93	-61.67	71492.0	2.34	2.67